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BY RON FOX

Making the cut

It's router cutters that actually do the work. Many routers come with a few free cutters. Others include a basic boxed set in the package. But if you're faced with buying your own, you have to know where to start

If you have clear objectives in mind and have bought an up-market router to achieve them, you're likely to buy good-quality individual cutters as you need them for your projects. However, for many users the simplest way to get started is to buy a medium-priced box of 12, 15 or more assorted cutters, **photo 1**. This is my

recommended option for newcomers to the routing business.

The main argument in favour is that you have a set that you can get on with, without having to scratch your head as to which ones to buy. In addition, you can develop your maintenance skills – cleaning and honing – without worrying about spoiling an expensive individual cutter.



Budget and medium-priced boxed sets of router cutters are available in compact storage boxes from Axminster, Trend, and **Wealden**

Start low and aim high

The important thing, in my view, is that your starter set should be at the lower end of the price range. There are some superb professional-grade sets around, but you'd better be certain that you will use most (if not all) of them before buying one. With most boxed sets, whatever their price, there

will be several cutters that you never, or hardly ever, use. This will cause you less concern if they are budget-priced than if you paid a fortune for them.

As you gain experience, you will add to your collection by buying individual cutters, or perhaps specialist sets such as for panelled door making, according to need. Here you will buy on what the Americans call a 'cost per cut' basis. With cutters that you'll use every day – straights are the most common example – it will always pay you to buy quality, whereas with a cutter needed for a one-off job a medium-priced version will probably be adequate.

Over the years I've accumulated individual cutters from all the top names in the business – CMT, Freud, Titman, Trend, and **Wealden**. The newest name on the scene is Makita; this well-known power tool manufacturer has just introduced a range of

British-made router cutters, which I'll be reviewing in a forthcoming issue.

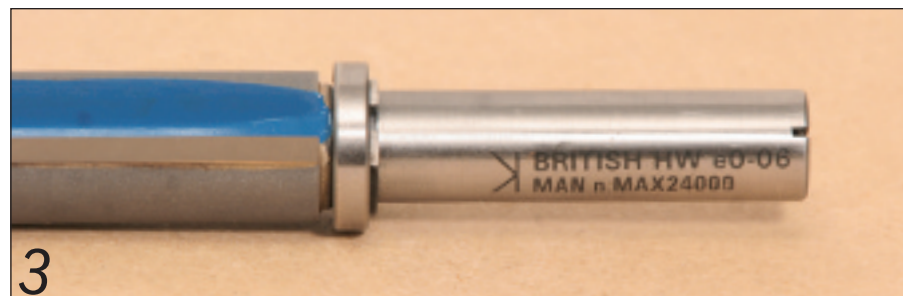
Cutting edge

The vast majority of cutters on the market are of tungsten carbide (often abbreviated to TCT, for tungsten carbide tipped). They consist of a steel body to which the tungsten carbide blades are brazed. With premium-grade cutters, small sizes such as 1/4in straights are often made from a solid tungsten carbide rod. Beware of very cheap (or free) Far Eastern cutters. I've had several of these where substantial bits of the carbide have flaked off in use. That's one reason why you should always wear eye protection when routing.

Other materials are used for more specialised applications, but for most of us the only practical alternative to TCT is High Speed Steel (HSS). There are still plenty of



Router cutters come in three sizes, with 1/2in, 3/8in, and 1/4in shanks (left to right)



Insert the cutter into the collet so the I of the K mark is flush with it

these made, and they're usually less expensive than TCT equivalents. The quality ones, if kept razor sharp with a diamond hone, give better results than TCT on furniture woods, but their edges don't last as long. Moreover, they can't be used on chipboard, plywood or MDF. The abrasive ingredients of these man-made boards will rapidly destroy the cutting edge.

Special occasions

The only time I use HSS cutters is on the WoodRat, where I get a better finish than with TCT cutters. Furthermore, because HSS dovetail cutters can be made to a slimmer and more elegant shape than TCT ones, they allow me to get closer to the appearance of an expert hand-cut dovetail.

Interestingly, there's a special high-performance grade called Super High Speed Steel (HSSE) that's used for cutters designed for the plastic and alloy window industry. Some of these can also be used on wood, but I find I get better results with cutters made specifically for the job.

Different diameters

Most of the routers on the UK market have $\frac{1}{4}$ in collets, so cutters with $\frac{1}{4}$ in shanks are the most numerous. They can also be used in the more powerful $\frac{1}{2}$ in collet machines. Here superior models include a $\frac{1}{4}$ in as well as a $\frac{1}{2}$ in collet, while lesser ones provide a $\frac{1}{4}$ in reducing sleeve. As I mentioned last month, these are nowhere as efficient for extended use as proper collets.

In recent years, more and more 8mm shank cutters have appeared in the UK, and many $\frac{1}{4}$ in routers now come with an additional 8mm collet, or offer one as an accessory.

There is a considerable difference in the cross-sectional area of $\frac{1}{4}$ in, 8mm and $\frac{1}{2}$ in shanks, **photo 2**, and the thicker the shank is the better, to minimise whip and chatter. If you have a $\frac{1}{2}$ in router, you should aim to use $\frac{1}{2}$ in shank cutters wherever possible.

A safe distance

For many years, cutter manufacturers advised router users to insert cutter shanks to at least three quarters of their length into the collet (if the collet allowed this). At the same time we were told not to ground the bottom of the shank on the motor spindle. If we did, we were liable to get vibration.

These days there are EU safety regulations regarding the use of router cutters. These stipulate, among other things, that every cutter should now have a mark on its shank to indicate how far into the collet it should be inserted. It's commonly called the K mark, because

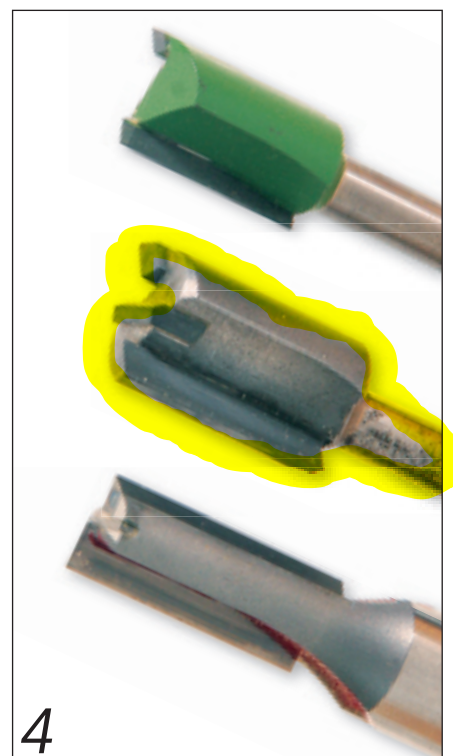
that's what it looks like, **photo 3**. However, some manufacturers still also specify the three-quarters rule, which tends to put the cutter shank in a little bit deeper than the regulations require.

Plunge cutters

It's commonly assumed that all straight cutters can be plunged into the work, but this is not the case. To be plunged, straight cutters of more than $\frac{1}{4}$ in diameter should have a central insert or something similar machined into the bottom, **photo 4**.

This centre insert allows the cutter to be plunged with less strain on the router, less wandering of the cut and less burning of the wood. Nevertheless, I'm sure we've all at some time plunged a non-plunging straight.

It is not just a matter of cost, although straights without the plunge centre are usually a bit cheaper than those with them. It's a question of whether the cutter is bought for plunge work or whether it will be used only for non-plunging cuts – making through housings and grooves, for example. You'll have to make that decision yourself, depending on the type of work you intend doing.



4

Straight cutters used for plunging need a central insert (middle and bottom)



5

Spiral cutters have either right-hand (upcut) and left-hand (downcut) twists



6 A selection of the products you'll need for cleaning and honing cutters



7 If the cutter has a bearing, remove it before you start the cleaning process



8 A household cleaner such as Astonish will shift almost any deposits

Cutter types

A typical boxed starter set includes several straights, two or three bearing-guided shaping cutters, a dovetail cutter, and perhaps a V-groover. As you gain experience you'll realise that the straights are your workhorse cutters, used for grooving, housing, jointing and most guide-bush work.

The remaining cutter types can be assigned to four main groups: trimmers, shapers, jointers, and 'specials'. I will examine these groups in more detail in a future article, but for now I'd like to draw attention to a special category of straight cutters: the spirals. Although these look anything but straight, they can in fact be used almost anywhere an ordinary straight would be used.

Versatile spirals

These are available in three main materials, HSS, HSSE, and solid carbide, although the

carbide ones are by far the most widespread. They also come in two different twists, **photo 5**: right-hand like a twist drill (known as upcut spirals), and left-hand (downcut spirals). The upcut spiral is the more widely used version, for creating mortises, grooves, housings, finger joints and pins for through dovetails. There is also a more specialised upcut/downcut spiral which is used in industry for tasks such as producing clean edges on double-faced chipboard, but you don't really need to know that!

The advantage of spirals over standard straight cutters is that the standard straight, with its two flutes, effectively gives the wood two hammer blows for each revolution. This causes a certain amount of vibration, and limits the rate at which the work can be run past the cutter. The spiral makes a shearing cut in the wood and always has some part of the blades in

contact with it. This results in less vibration, a cleaner cut, and a faster rate of feed.

Performance at a price

Spirals first became popular in industrial use, but their value was soon recognised for general workshop routing situations. They're more expensive than corresponding quality straights, and become extremely so with the larger sizes, but they're well worth buying in one or two of your favourite sizes. My favourite – and I use it a lot – is an 8mm diameter upcut on an 8mm shank from Wealden. It's part no T8U8000C, and costs £32.83. Ouch!

One thing you absolutely cannot do with a spiral is hone it when it gets blunt, so you will want to check with your supplier that a sharpening service is available should you need it. Several suppliers provide such a service for their own spirals; one of these is Wealden.



9 Apply lubricant to the hone and give each edge ten light strokes



10 After use, wipe the hone dry and remove any marks with a pencil rubber

Clean cuts better

Whatever grade your cutters – budget, mid-range or premium – you won't get the best out of them unless you clean them and keep their edges sharp with a diamond hone, **photo 6**. Let's look at cutter cleaning first.

Dirty cutters with resin deposits on the blades will heat up when you next use them, dulling the cutting edges. A clean cutter always produces sharper, cleaner cuts.

To clean a cutter, begin by removing the bearing if it has one. Be careful: brand-new cutters often have the bearings screwed on really tightly. Grip the cutter with a gardening glove or rag; it might save you from suffering scraped fingers.

Next, brush off loose dust with an old toothbrush or similar small brush. A residue of resin and burnt-on deposits will remain. Remove these with a rag wetted with cutter cleaner, **photo 7**. I use either Trend Tool & Bit Cleaner or CMT Cutter cleaner. These products aren't cheap, but a little goes a very long way so they're actually quite economical to use.

Alternative cleaners

Occasionally, especially if you've been working with chipboard, you may find heavy black deposits which can't be shifted with the commercial router cleaners. What you can use then is a mildly abrasive household cleaner. The one I use is called Astonish, and it's available from household goods stores and mail-order catalogues. Apply a little on a damp cloth, **photo 8**, and you should be able to shift almost anything. By the way, some router users enthuse over oven cleaner, but I find it altogether too messy and unpleasant.

Remember that cleaning up is much easier if you can bring yourself to do it as you go along. A cutter that's just been removed from the router will still be warm, and any resin on it will still be soft. Almost any of the well-known spray lubricants will clean it in an instant, and lubricate it for the future as well.

If you're just having a cleaning session, spray the freshly cleaned cutters with WD40 or one of the other 'dry' lubricants to prevent corrosion and keep them in good nick for the next time you use them. Take care if you use WD40 to keep it away from cutter bearings. Its aggressive action will soon drive out the built-in lubricant.



11

Store your cutters in proprietary trays, or make your own storage blocks

Staying sharp

More often than not, however, after cleaning you'll want to restore the cutter's edge with a hone. The currently most popular hone is the 'credit card' diamond hone. I use the Trend one, which is double sided – fine and coarse. Fine is the everyday grade for honing router cutters, but the coarse side is useful for starting to bring back a blunter-than-usual edge. Trend also recommend using the coarse side of the hone for sharpening HSS cutters.

To sharpen a cutter, use the hone with a lubricant. Don't use it dry. Don't use oil or WD40 either; they're too viscous, and quickly build up a barrier between the microscopic particles of tungsten carbide and the minute particles of diamond. For years, water was the only lubricant recommended, but Trend now supply a lapping fluid which I use all the time.

Gently does it

Dab a little of the lubricant on the hone and bed the face of the blade flat on the surface. Rub it gently back and forth, **photo 9**; all the hone manufacturers are united in saying 'Let the diamond do the work'. If the diamond surface turns black, metal is being removed. Give each edge the same number of strokes to preserve the balance of the cutter. I usually give each edge ten very light strokes and then check the sharpness with my thumb. As a last job, wipe the hone dry and clean off any cutter marks with a pencil rubber, **photo 10**.

A few cutters will be found impossible to hone, but the vast majority – including shaping cutters once the bearing is removed – present no problem.

Store with care

Don't store your cutters loose in a tool bag, box or drawer; they'll end up with chipped and useless blades. Boxed sets provide their own storage. You can keep individual cutters in the plastic cases or envelopes they're sold in, but they'll be more readily accessible if kept in a storage tray such as the Trend ones that I reviewed in the April issue of *The Woodworker*, **photo 11**.

Alternatively you can make your own storage blocks, drilled with holes to accept the different shank sizes. I always drill slightly oversize holes in case the wood shrinks: 6.5mm for 1/4in shanks, 8.5mm for 8mm shanks and 13mm for 1/2in shanks. If you can be bothered to mould the edges of the blocks with a shaping cutter, they'll look all the better for it!

FURTHER INFORMATION

- CMT cutters
- Axminster Centre
- 0800 371822
- www.axminster.co.uk
- Freud
- 0870 770 4275
- www.freudtooling.co.uk
- Titman
- 01255 220123
- www.titman.co.uk
- Trend
- 0800 487363
- www.trenduk.com
- Wealden Tool Company
- 0800 328 4183
- www.wealdentool.com